Access DB# 196702

SEARCH REQUEST FORM

Scientific and Technical Information Center

Requester's Full Name: Kelly Stouffer Examiner #: 82787 Date: 7-27-06
Art Unit: 1762 Phone Number 30 Serial Number: 10/696591 Appl #
Mail Box and Bldg/Room Location: 8A64 Results Format Preferred (circle): PAPER DISK E-MAIL

If more than one search is submitted, please prioritize searches in order of need.

****

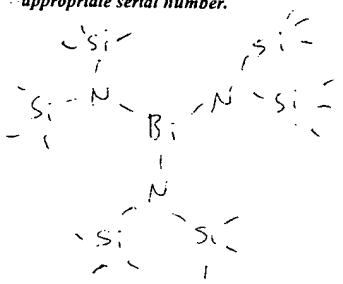
Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc, if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

Title of Invention: Process for producing oxide films

Inventors (please provide full names): Venkamaki et al.

Earliest Priority Filing Date: 2003

**For Sequence Searches Only* Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.*



Structure

Bi compound of silylamide ligands as a precursor for a bismuth oxide film

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STAFF USE ONLY	Type of Search		Vendors and cost where applicable	
Searcher: Ed	NA Sequence (#)		STN	
Searcher Phone #:	AA Sequence (#)		Dialog	
Searcher Location:	Structure (#)		Questel/Orbit	
Date Searcher Picked Up:	Bibliographic		Dr.Link	
Date Completed: 7-28-06	Litigation		Lexis/Nexis	
Searcher Prep & Review Time:	Fulltext		Sequence Systems	
Clerical Prep Time:	Patent Family		WWW/Internet	
Online Time:	Other		Other (specify)	

PTO-1590 (8-01)

WHAT IS CLAIMED IS:

1. A process for producing a bismuth-containing oxide thin film by Atomic Layer Deposition (ALD), wherein an organic bismuth compound having at least one silylamido ligand is used as a source material for the bismuth-containing oxide thin film.

2. The process according to Claim 1, wherein the organic bismuth compound comprises a tris(bis(trialkylsilyl)amido) bismuth(III) compound, in which each alkyl is a lower alkyl group having 1 to 4 carbon atoms.

3. The process according to Claim 2, wherein each alkyl is the same.

4. The process according to Claim 2, wherein each alkyl is different.

5. The process according to Claim 16, wherein one or more tris(bis(trialkylsilyl)amido) bismuth(III) compound is selected from the group consisting of tris(bis(trimethylsilyl)amido) bismuth(III), tris(bis(ethyldimethylsilyl)amido) bismuth(III), tris(bis(n-butyldimethylsilyl)amido) bismuth(III), and tris(bis(triethylsilyl)amido) bismuth(III) and tris(bis(tri-n-propylsilyl)amido) bismuth(III).

6. The process according to Claim 1, wherein the organic bismuth compound comprises a bismuth compound with 1 to 3 silylamido ligands having the formula of Equation 1:

$$-N(SiR^1R^2R^3)_2 \qquad \text{(Equation 1)}$$

wherein each R^1, R^2, R^3 is independently selected from the group consisting of:

linear or branched C_1-C_{20} alkyl and C_1-C_{20} alkenyl groups,

halogenated alkyl and halogenated alkenyl groups, wherein the halogenated alkyl and halogenated alkenyl groups have at least one hydrogen atom replaced with a fluorine, chlorine, bromine or iodine atom,

carbocyclic groups; and

heterocyclic groups.

7. The process according to Claim 6, wherein at least one of R^1, R^2, and R^3 is a C_1-C_{20} alkyl or a C_1-C_{20} alkenyl selected from the group consisting of methyl, ethyl, n- and i-propyl, n-, sec- and t-butyl.

8. The process according to Claim 6, wherein at least one of R^1, R^2, and R^3 is the carbocyclic group and the carbocyclic group is an aryl.

9. The process according to Claim 6, wherein at least one of R^1, R^2, and R^3 is the carbocyclic group selected from the group consisting of phenyl, alkylaryl, and halogenated carbocyclic groups.

10. A process for depositing a bismuth oxide layer on a substrate by Atomic Layer Deposition (ALD) comprising:

feeding into a reaction space a vapor phase pulse of an organic bismuth compound source material having at least one bis(trialkylsilyl)amido ligand; and

pulsing into the reaction space a pulse of an oxygen source material capable of forming an oxide with the organic bismuth compound source material.

11. The process according to Claim 10, wherein the feeding and pulsing produce a ternary oxide thin film.

12. The process according to Claim 11, wherein the ternary oxide thin film comprises a second metal source material selected from the group consisting of copper, titanium, tantalum, calcium, strontium, silicon and aluminum oxides.

13. The process according to Claim 12, wherein the ternary oxide thin film comprises $Bi_4Ti_3O_{12}$.

14. The process according to Claim 10, wherein the feeding and pulsing produce a multicomponent oxide thin film.

15. The process according to Claim 14, wherein the multicomponent oxide thin film comprises at least two further metal oxides selected from the group consisting of copper, titanium, tantalum, calcium and strontium oxides.

16. The process according to Claim 15, wherein the multicomponent oxide thin film is selected from the group consisting of $Bi_4Ti_3O_{12}$, $(Bi,La)_4Ti_3O_{12}$, $SrBi_2Ta_2O_9$, and $Bi_2Sr_2CaCu_2O_{8+x}$.

17. The process according to Claim 10, wherein the bismuth oxide layer is deposited at a temperature of less than about 250°C.

18. The process according to Claim 17, wherein the bismuth oxide layer is deposited at a deposition temperature in the range of about 150°C to about 220°C.

19. The process according to Claim 12, wherein the second metal oxide is deposited from a second metal source material selected from the group consisting of halides and metal organic compounds.

20. The process according to Claim 19, wherein the second metal source material is selected from the group consisting of alkoxy, alkylamino, cyclopentadienyl, dithiocarbamate and betadiketonate compounds.

21. The process according to Claim 19, wherein the second metal source material comprises a double metal precursor in which each molecule contains two metals in a discrete ratio.

22. The process according to Claim 10, wherein the oxygen source material comprises one or more reactants selected from the group consisting of water, oxygen, hydrogen peroxide, aqueous solution of hydrogen peroxide, ozone, oxides of nitrogen, halide-oxygen compounds, peracids, alcohols, alkoxides, and oxygen-containing radicals.

23. The process according to Claim 10, further comprising purging the reaction space with an inactive gas between pulses.

24. The process according to Claim 10, wherein feeding into the reaction space the vapor phase pulse of the organic bismuth compound comprises mixing a carrier gas with the vapor phase pulse.

25. The process according to Claim 10, wherein the bismuth oxide layer is deposited to serve as a functional layer which is selected from the group consisting of a ferroelectric layer, a dielectric layer, and a super-conducting layer.

26. A process for forming a bismuth-containing multicomponent oxide thin film by Atomic Layer Deposition (ALD) on a substrate in a reaction space, comprising:

alternately feeding into the reaction space vapor phase pulses of a first metal source material, a second metal source material, and an oxygen source material capable of forming an oxide with the first metal source material and the second metal source material, wherein

said first metal source material is an organic bismuth compound having at least one bis(trialkylsilyl)amido ligand, and

said second metal source material is a volatile compound of a transition metal or a volatile compound of a main group metal.

27. The process according to Claim 26, wherein one or more said second metal source material comprises one or more reactants selected from the group consisting of groups 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, and 14 of a periodic table of elements.

28. The process according to Claim 26, wherein each vapor phase pulse of the first and second metal source materials is followed by a pulse of the oxygen source material.

29. The process according to Claim 28, wherein a ratio of bismuth precursor cycles to second metal source cycles is from about 10:1 to about 1:10, wherein each cycle includes a pulse of an oxygen source material.

30. The process according to Claim 29, wherein the ratio is from about 6:1 to about 1.5:1 and the multicomponent oxide thin film contains a stoichiometric surplus of 1 to 20 atomic percentage of bismuth.

31. The process according to Claim 26, further comprising:

depositing a first laminar metal oxide layer formed from the first metal source material and a second laminar metal oxide layer formed the second metal source material; and

annealing a selected ratio of the first and second laminar layers to provide a ferroelectric phase.

32. The process according to Claim 26, wherein the multipcomponent oxide thin film is a ternary oxide film, the method further comprising:

feeding alternating pulses of the organic bismuth compound and the second metal source material, followed by a pulse of the oxygen source material, into the reaction space to form an amorphous film; and

annealing the amorphous film in the presence of an oxygen-containing gas.

33. The process according to Claim 26, wherein the multicomponent thin film formed is selected from the group consisting of $Bi_4Ti_3O_{12}$, $(Bi,La)_4Ti_3O_{12}$, $SrBi_2Ta_2O_9$ and $Bi_2Sr_2CaCu_2O_{8+x}$.

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L3            65 S (C(L)H(L)BI(L)N(L)SI)/ELS
L4            22 S L3 (L) 5/ELC.SUB
L5            43 S L3 NOT L4

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L6            41 S VEHKAMAKI ?/AU
L7            20 S HATANPAA ?/AU
L8           260 S RITALA ?/AU
L9           405 S LESKELA ?/AU
L10            5 S L6 AND L7 AND L8 AND L9
               SEL L10 1-5 RN

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L12            8 S L11 AND BI/ELS

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L13            4 S E50-E53

     FILE 'HCA' ENTERED AT 18:34:25 ON 28 JUL 2006
L14         5169 S PEALD OR ALD OR (AT OR ATOMIC?)(3A)LAYER?(3A)DEPOSIT?
L15       117195 S (CVD OR (CHEMICAL? OR CHEM)(2A)(VAPOR? OR VAPOUR?)(2A)D
L16        64316 S FERROELEC? OR FERRO(2A)ELEC?
L17        39993 S (AT OR ATOMIC?)(2A)(LAYER? OR EPITAX?) OR LAYER?(2A)EPI
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L18      166474 S (VAPOR? OR VAPOUR?)(2A)DEPOSIT?
L19        2622 S ?SILYLAMID? OR ?SILYL(W)AMID?

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                E BISMUTH/CN
L20             1 S E3

     FILE 'HCA' ENTERED AT 18:40:39 ON 28 JUL 2006
L21               QUE L20 OR BI OR BISMUTH#
L22            30 S L19 AND L21
L23             4 S L22 AND (L14-L18)
L24            36 S L4
L25            26 S L5
L26             8 S L24 AND (L14-L18)
L27             0 S L25 AND (L14-L18)

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L28          7651 S (FILM? OR THINFILM? OR LAYER? OR OVERLAY? OR OVERLAID?

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L30             4 S L22 AND L29
L31             5 S L24 AND L29
L32             0 S L25 AND L29
L33             9 S L23 OR L26 OR L30 OR L31
L34            28 S L24 NOT L33
L35            25 S L25 NOT (L33 OR L34)
L36            27 S L34 AND 1840-2003/PY,PRY
L37            24 S L35 AND 1840-2003/PY,PRY

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=> d l2 que stat
L1                STR

Bi⋇N⋇Si
 1   2   3

NODE ATTRIBUTES:
NSPEC   IS RC     AT   1
NSPEC   IS RC     AT   2
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NSPEC IS RC AT 3
DEFAULT MLEVEL IS ATOM
DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:
RING(S) ARE ISOLATED OR EMBEDDED
NUMBER OF NODES IS 3

STEREO ATTRIBUTES: NONE
L2 1 SEA FILE=REGISTRY SSS SAM L1

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=> d l33 1-9 cbib abs hitstr hitind

L33 ANSWER 1 OF 9 HCA COPYRIGHT 2006 ACS on STN
142:440314 Process for producing **oxide films.**
Vehkamaki, Marko; Hatanpaa, Timo; Ritala, Mikko; Leskela, Markku (Finland). U.S. Pat. Appl. Publ. US 2005089632 A1 20050428, 9 pp. (English). CODEN: USXXCO. APPLICATION: US 2003-696591 20031028.
AB A process for producing **bismuth**-contg. **oxide** thin **films** by **At. Layer Deposition**, including using an org. **bismuth** compd. having at least one **silylamido** ligand as a source material for the **bismuth** oxide. **Bismuth**-contg. **oxide** thin **films** produced by the preferred

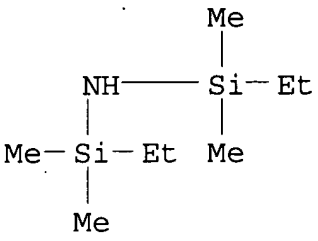
embodiments can be used, for example, as **ferroelec.** or dielec. material in integrated circuits and/or as superconductor materials.

IC ICM C23C016-00
INCL 427248100
CC 76-8 (Electric Phenomena)
ST **PEALD PECVD bismuth ferroelec** thin film
IT **Atomic layer epitaxy**
Ferroelectric films
(**PEALD** process for **bismuth**-contg. **oxide film** for **ferroelec.** device)
IT **Vapor deposition** process
(plasma; **PEALD** process for **bismuth**-contg. **oxide film** for **ferroelec.** device)
IT 11115-71-2, **Bismuth** titanium oxide 114901-61-0, **Bismuth** calcium copper strontium oxide 166877-45-8, **Bismuth** strontium tantalum oxide 185619-35-6, **Bismuth** lanthanum titanium oxide
(**PEALD** process for **bismuth**-contg. **oxide film** for **ferroelec.** device)

L33 ANSWER 2 OF 9 HCA COPYRIGHT 2006 ACS on STN
142:85289 **Bismuth** precursors for **atomic layer deposition** of **bismuth**-containing **oxide films.** Vehkamaeki, Marko; Hatanpaeae, Timo; Ritala, Mikko; Leskelae, Markku (Laboratory of Inorganic Chemistry, Department of Chemistry, University of Helsinki, Helsinki, FIN-00014, Finland). Journal of Materials Chemistry, 14(21), 3191-3197 (English) 2004. CODEN: JMACEP. ISSN: 0959-9428. OTHER SOURCES: CASREACT 142:85289. Publisher: Royal Society of Chemistry.

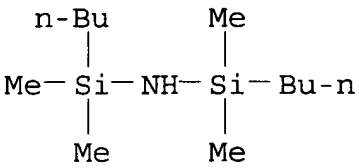
AB Several **Bi** amides and a **Bi** thioamidate compd. were synthesized and characterized to find volatile **Bi** precursors for **at. layer deposition** (**ALD**) of oxide materials. Crystal structures of **Bi** (N(SiMe3)2)3 and **Bi**(SC(Me)NPri)3 are reported. Based on precursor characterization **Bi**(N(SiMe3)2)3 was selected for film deposition expts. Alternate surface reactions of **Bi** (N(SiMe3)2)3 and H2O can be used for **ALD** of amorphous BiOx, **Bi**-Ta-O and Sr-**Bi**-Ta-O at 190-200°. After post-deposition annealing at 800° in O the SrBi2Ta2O9 layered perovskite phase was obtained.

IT **811788-47-3P 811788-49-5P 811788-51-9P**
(prepn. and thermal decompn.)
RN 811788-47-3 HCA
CN Silanamine, 1-ethyl-N-(ethyldimethylsilyl)-1,1-dimethyl-, bismuth(3+) salt (9CI) (CA INDEX NAME)



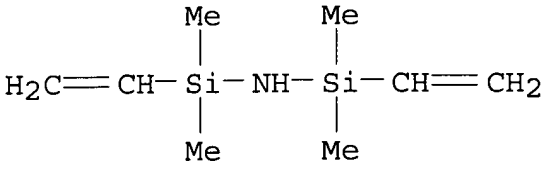
●1/3 Bi(III)

RN 811788-49-5 HCA
CN Silanamine, 1-butyl-N-(butyldimethylsilyl)-1,1-dimethyl-, bismuth(3+) salt (9CI) (CA INDEX NAME)



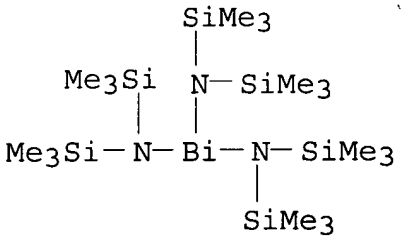
●1/3 Bi(III)

RN 811788-51-9 HCA
CN Silanamine, 1-ethenyl-N-(ethenyldimethylsilyl)-1,1-dimethyl-, bismuth(3+) salt (9CI) (CA INDEX NAME)



●1/3 Bi(III)

IT **76505-24-3P**
(prepn., crystal structure, thermal decompn. and precursor for **at. layer deposition** of **bismuth oxide films**)
RN 76505-24-3 HCA
CN Bismuthinetriamine, hexakis(trimethylsilyl)- (9CI) (CA INDEX NAME)



CC 78-7 (Inorganic Chemicals and Reactions)
Section cross-reference(s): 75
ST **bismuth silylamide** prepn thermal decompn potential oxide precursor; **atomic layer deposition bismuth oxide film silylamide** precursor; crystal structure **bismuth trimethylsilylamide** thioamidate complex
IT Coating process
(**at. layer deposition**; prepn. of **bismuth** amide precursors for **at. layer deposition** of **bismuth**-contg. **oxide films**)
IT Thermal decomposition
(of **bismuth** amide complexes)
IT Crystal structure
Molecular structure

(of **bismuth** bis(**trimethylsilyl**)**amide** and isopropylamidate complexes)

IT 1304-76-3P, **Bismuth oxide**, preparation
50811-07-9P, **Bismuth** strontium tantalum **oxide** (Bi2SrTa2O9) 140883-51-8P, **Bismuth** tantalum **oxide** 166877-45-8P, **Bismuth** strontium tantalum **oxide**
(**at. layer deposition** of films from **bismuth hexamethylsilylamide** precursor)

IT 57376-43-9P **811788-47-3P 811788-49-5P 811788-51-9P** 811788-55-3P 811788-57-5P
(prepn. and thermal decompn.)

IT **76505-24-3P**
(prepn., crystal structure, thermal decompn. and precursor for **at. layer deposition** of **bismuth oxide films**)

IT 220057-73-8
(reactant for **at. layer deposition** of **bismuth** strontium tantalum films)

IT 6074-84-6, Tantalum pentaethoxide
(reactant for **at. layer deposition** of **bismuth** tantalum films)

IT 108-18-9, Diisopropylamine 109-89-7, Diethylamine, reactions 999-97-3, Hexamethyldisilazane 2253-73-8, Isopropyl isothiocyanate 7691-02-3 17882-94-9 82356-80-7
(reactant for prepn. of **bismuth** amide compd.)

IT 22687-02-1P, [2-(tert-Butylamino)ethyl]dimethylamine
(reactant for prepn. of **bismuth** amide compd.)

L33 ANSWER 3 OF 9 HCA COPYRIGHT 2006 ACS on STN

142:15323 **MOCVD** sources, compositions therefor, and composition-regulated **ferroelectric** film deposition therewith. Onosawa, Kazuhisa; Yoshinaka, Atsuya; Yamada, Naoki; Sakurai, Atsushi (Asahi Denka Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2004332033 A2 20041125, 16 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2003-128115 20030506.

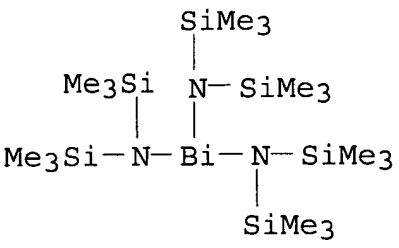
AB The films, i.e., Bi titanate-type double **oxide** **films** useful for film capacitors, are deposited from sources consisting of 1:(0.05-10) (mol) Bi[NR1(SiR2R3R4)]3 and Ti(NR5R6)4 [R1 = H, C1-4 alkyl, SiR7R8R9; R2-R4 = H, C1-4 alkyl (essentially contg. C1-4 alkyl); R5, R6 = H, C1-8 hydrocarbyl, SiR10R11R12 (essentially contg. H); R7-R9, R10-R12 = H, C1-4 alkyl (essentially

contg. C1-4 alkyl)]. The sources may contain 5-100 parts (to 1 parts the Bi compds.) org. solvents.

IT **76505-24-3**
(**MOCVD** sources producing bismuth titanate-type **ferroelec.** films with well-controlled compns.)

RN 76505-24-3 HCA

CN Bismuthinetriamine, hexakis(trimethylsilyl)- (9CI) (CA INDEX NAME)



IC ICM C23C016-40
ICS C07F007-00; C07F019-00; H01L021-316; H01L027-105

CC 76-8 (Electric Phenomena)
Section cross-reference(s): 57, 75

ST **ferroelec** bismuth titanate **MOCVD** source decomposability optimized; organometallic bismuth titanium **CVD** source oxide deposition; trimethylsilylaminobismuth diethylaminotitanium **ferroelec** film **MOCVD** source

IT **Ferroelectric** films
(**MOCVD** sources producing bismuth titanate-type **ferroelec.** films with well-controlled compns.)

IT **Vapor deposition** process
(metalorg.; **MOCVD** sources producing bismuth titanate-type **ferroelec.** films with well-controlled compns.)

IT 142-68-7, Tetrahydropyran
(**MOCVD** source; **MOCVD** sources producing bismuth titanate-type **ferroelec.** films with well-controlled compns.)

IT 4419-47-0 **76505-24-3**
(**MOCVD** sources producing bismuth titanate-type **ferroelec.** films with well-controlled compns.)

IT 797756-87-7P, Bismuth silicon titanium oxide
(**MOCVD** sources producing bismuth titanate-type **ferroelec.** films with well-controlled compns.)

L33 ANSWER 4 OF 9 HCA COPYRIGHT 2006 ACS on STN

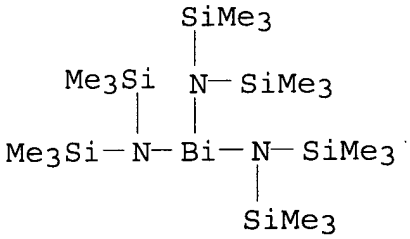
141:430841 Compositions containing bismuth silylamine complexes and rare earth silylamine complexes, their **CVD** sources, and manufacture of rare earth-substituted bismuth titanate thin films using them. Onosawa, Kazuhisa; Yoshinaka, Atsuya; Yamada, Naoki; Sakurai, Atsushi (Asahi Denka Kogyo K. K., Japan). Jpn. Kokai Tokkyo Koho JP 2004331542 A2 20041125, 18 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2003-128116 20030506.

AB The compns. contain 1 mol part Bi(NR1SiR2R3R4)3 and 0.01-1 mol part M(NR5SiR6R7R8)3 (R1, R5 = H, C1-4 alkyl, SiR9R10R11; one of R2-R4, one of R6-R8, one of R9-R11 = C1-4 alkyl; other two of R2-R4, other two of R6-R8, other two of R9-R11 = H, C1-4 alkyl; M = rare earth metal). Preferably, the compns. further contain Ti(NR15R16)4 (one of R15 and R16 = H, C1-8 hydrocarbyl, SiR17R18R19; the other of R15 and R16 = C1-8 hydrocarbyl, SiR17R18R19; one of R17-R19 = C1-4 alkyl; other two of R17-R19 = H, C1-4 alkyl). The films are useful for **ferroelec.** nonvolatile memory devices.

IT **76505-24-3**
(compns. contg. bismuth silylamine complexes and rare earth silylamine complexes as **CVD** sources for manuf. of rare earth-substituted bismuth titanate thin films for **ferroelec.** nonvolatile memory devices)

RN 76505-24-3 HCA

CN Bismuthinetriamine, hexakis(trimethylsilyl)- (9CI) (CA INDEX NAME)



IC ICM C07F019-00
ICS C23C016-40; H01L021-316; C07F007-02; C07F009-94

CC 76-8 (Electric Phenomena)
Section cross-reference(s): 75

ST silylamine bismuth complex **CVD ferroelec** film; **CVD ferroelec** film rare earth silylamine complex; rare earth bismuth titanate **ferroelec** film **CVD**; **ferroelec** nonvolatile memory device rare earth bismuth titanate

IT **Vapor deposition** process
(**chem.**; compns. contg. bismuth silylamine complexes and rare earth silylamine complexes as **CVD** sources for manuf. of rare earth-substituted bismuth titanate thin films for **ferroelec.** nonvolatile memory devices)

IT Nonvolatile memory devices
(**ferroelec.**; compns. contg. bismuth silylamine complexes and rare earth silylamine complexes as **CVD** sources for manuf. of rare earth-substituted bismuth titanate thin films for **ferroelec.** nonvolatile memory devices)

IT **Ferroelectric** memory devices
(nonvolatile; compns. contg. bismuth silylamine complexes and rare earth silylamine complexes as **CVD** sources for manuf. of rare earth-substituted bismuth titanate thin films for **ferroelec.** nonvolatile memory devices)

IT 4419-47-0 35788-99-9 41836-23-1 **76505-24-3**
(compns. contg. bismuth silylamine complexes and rare earth silylamine complexes as **CVD** sources for manuf. of rare earth-substituted bismuth titanate thin films for **ferroelec.** nonvolatile memory devices)

IT 637776-64-8P, Bismuth lanthanum silicon titanium oxide
795288-05-0P, Bismuth niobium silicon titanium oxide
(compns. contg. bismuth silylamine complexes and rare earth silylamine complexes as **CVD** sources for manuf. of rare earth-substituted bismuth titanate thin films for **ferroelec.** nonvolatile memory devices)

L33 ANSWER 5 OF 9 HCA COPYRIGHT 2006 ACS on STN
136:286888 **Vapor deposition** of metal oxides, silicates and phosphates, and silicon dioxide. Gordon, Roy G.; Becker, Jill; Hausmann, Dennis; Suh, Seigi (President and Fellows of Harvard College, USA). PCT Int. Appl. WO 2002027063 A2 20020404, 51 pp. DESIGNATED STATES: W: JP, KR, US; RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2001-US30507 20010928. PRIORITY: US 2000-2000/PV23628U 20000928; US 2000-2000/PV253917 20001129.

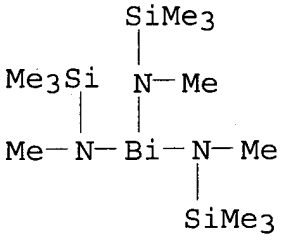
AB Metal silicates or phosphates are deposited on a heated substrate by the reaction of vapors of alkoxysilanols or alkylphosphates along with reactive metal amides, alkyls or alkoxides. For example, vapors of tris-(ter-butoxy)silanol react with vapors of tetrakis(ethylmethylamido)hafnium to deposit Hf silicate on surfaces heated to 300°. The product film has a very uniform

stoichiometry throughout the reactor. Similarly, vapors of diisopropylphosphate react with vapors of Li bis(ethyldimethylsilyl)amide to deposit Li phosphate films on substrates heated to 250°. Supplying the vapors in alternating pulse produces these same compns. with a very uniform distribution of thickness and excellent step coverage.

IT **7566-57-6 76505-24-3**
(**vapor deposition** of metal silicates and phosphates by reacting alkoxysilanol or alkylphosphates with metal or metalloid compd.)

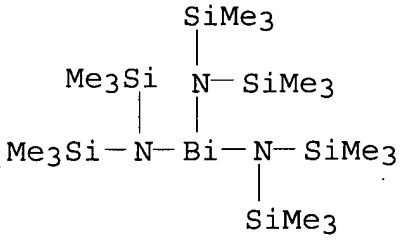
RN 7566-57-6 HCA

CN Bismuthinetriamine, N,N',N''-trimethyl-N,N',N''-tria(trimethylsilyl)- (9CI) (CA INDEX NAME)



RN 76505-24-3 HCA

CN Bismuthinetriamine, hexakis(trimethylsilyl)- (9CI) (CA INDEX NAME)



IC ICM C23C016-40

CC 75-1 (Crystallography and Liquid Crystals)

ST **atomic layer deposition** metal silicate phosphate oxide silica; **CVD** metal silicate phosphate oxide silica

IT **Vapor deposition** process
(**at. layer deposition**;
vapor deposition of metal silicates and phosphates by reacting alkoxysilanol or alkylphosphates with

metal or metalloid compd.)

IT **Vapor deposition** process
(**chem.**; **vapor deposition** of metal silicates and phosphates by reacting alkoxysilanol or alkylphosphates with metal or metalloid compd.)

IT Engines
(fuel injectors; **vapor deposition** of metal silicates and phosphates by delivering pulses of solns. of precursors into nitrogen carrier gas using)

IT Valves
(sampling; **vapor deposition** of metal silicates and phosphates by delivering pulses of solns. of precursors into nitrogen carrier gas using)

IT Organometallic compounds
(**vapor deposition** of material comprising oxygen and metals by exposing heated surface alternately to organometallic compds. then to arene hydrate)

IT 128870-07-5, Benzene hydrate 406462-51-9
(pure and substituted; **vapor deposition** of material comprising oxygen by exposing substrate to)

IT 12651-01-3, Phosphorus oxide (PO3)
(**vapor deposition** of material comprising phosphorus by exposing substrate to)

IT 154030-95-2
(**vapor deposition** of material comprising silicon by exposing substrate to)

IT 75-65-0, tert-Butanol, processes 1314-23-4, Zirconium diOxide, processes 1314-61-0, Tantalum oxide (Ta2O5) 7631-86-9, Silicon dioxide, processes 7732-18-5, Water, processes 12055-23-1, Hafnium Oxide
(**vapor deposition** of metal oxides by exposing heated surface alternately to metal amides then to water or alc.)

IT 75-24-1, Trimethylaluminum 121-43-7, Trimethyl borate 506-82-1, Dimethylcadmium 542-63-2, Diethylberyllium 544-97-8, Dimethylzinc 546-68-9, Tetrakis(isopropanolato)titanium 557-20-0, Diethylzinc 593-91-9, Trimethylbismuthine 617-85-6, Triethylstibine 813-78-5 867-97-0, Tris(diethylamino)borane 1066-77-9, Tetrakis(dimethylamino)stannane 1070-89-9, Sodium bis(trimethylsilyl)amide 1271-24-5, Chromocene 1271-86-9 1272-21-5, Tris(η5-cyclopentadienyl)gadolinium 1272-23-7, Tris(η5-cyclopentadienyl)lanthanum 1272-26-0, Tris(η5-cyclopentadienyl)thulium 1273-98-9,

Tris(η5-cyclopentadienyl)neodymium 1277-43-6, Cobaltocene 1277-47-0, Vanadocene 1294-07-1, Tris(η5-cyclopentadienyl)yttrium 1295-20-1, Tris(η5-cyclopentadienyl)ytterbium 1298-53-9, Tris(η5-cyclopentadienyl)cerium 1298-54-0 1298-55-1, Tris(η5-cyclopentadienyl)samarium 1312-81-8, Lanthanum oxide 1316-98-9 1335-30-4, Aluminum Silicate 1445-79-0, Trimethylgallium 1611-31-0 1624-01-7, Tetrakis(dimethylamino)silane 2081-12-1, Tetrakis(tert-butanolato)zirconium 2172-02-3 3236-82-6 3275-24-9, Tetrakis(dimethylamido)titanium 3323-04-4, Bis(bis(trimethylsilyl)amido)cadmium 3385-78-2, Trimethylindium 3999-27-7, Bis(bis(trimethylsilyl)amido)zinc 4039-32-1, Lithium bis(trimethylsilyl)amide 4104-81-8 4375-83-1, Tris(dimethylamino)borane 4419-47-0, Tetrakis(diethylamido)titaniu m 6074-84-6 6596-96-9, Hexamethylarsenous triamide 7289-92-1 7344-40-3, Tetrakis(dimethylamino)germane 7529-46-6 7529-48-8 **7566-57-6** 10377-52-3, Lithium Phosphate 11077-59-1, Tris(cyclopentadienyl) praseodymium 12078-25-0, Dicarbonyl(η5-cyclopentadienyl)cobalt 12212-68-9, Bis(ethylbenzene)chromium 12261-30-2 12636-72-5, Bis(η5-cyclopentadienyl)dimethylzirconium 13801-49-5, Tetrakis(diethylamido)zirconium 13859-65-9, Tetrakis(trifluorophosphine)nickel 14096-82-3, Tricarbonyl(nitrosyl)cobalt 14314-61-5 14760-22-6, Bis(bis(trimethylsilyl)amido)iron 15112-89-7, Tris(dimethylamino)silane 15821-76-8 16530-82-8 17048-10-1, Tetrakis(diethylamino)silane 18166-43-3 18741-03-2, Magnesium bis(bis(trimethylsilyl)amide) 19756-04-8, Tetrakis(dimethylamido)zirconium 19782-68-4, Tetrakis(dimethylamido)hafnium 19824-55-6, Tetrakis(diethylamido)hafnium 19824-56-7 19824-57-8 19824-58-9, Pentakis(dimethylamido)niobium 19824-59-0 19824-60-3 19851-68-4, Tris(diisopropylamido)chromium 20302-36-7, Tris(cyclopentadienyl)indium 20607-91-4 21941-96-8, Tetrakis(diethylamino)stannane 22999-67-3, Tris(bis(trimethylsilyl)amido)iron 25169-05-5 25605-37-2 25733-02-2, Beryllium, Bis(bis(trimethylsilyl)amino)- 29865-05-2 31978-09-3, Tetrakis(methylamino)silane 32093-39-3, Hexakis(dimethylamido)dialuminum 32877-00-2, Bis(ethylbenzene)molybdenum 33851-46-6, Tetrakis(dimethylamido)molybdenum 33851-47-7 34822-90-7,

Cyclopentadienyl thallium 35450-28-3,
Tris(bis(trimethylsilyl)amido)gallium 35450-29-4,
Tris(bis(trimethylsilyl)amido)indium 35788-99-9,
Tris(bis(trimethylsilyl)amido)lanthanum 35789-00-5,
Tris(bis(trimethylsilyl)amido)praseodymium 35789-01-6,
Tris(bis(trimethylsilyl)amido)samarium 35789-02-7 35789-03-8
35789-04-9, Tris(bis(trimethylsilyl)amido)lutetium 37512-28-0
37512-29-1, Tris(bis(trimethylsilyl)amido)titanium 37512-30-4,
Tris(bis(trimethylsilyl)amido)vanadium 37512-31-5 38182-82-0,
Tetrakis(diethylamino)germane 38227-87-1 39330-74-0,
Tris(η5-cyclopentadienyl)erbium 40678-58-8,
Tetrakis(diethylamido)thorium 40678-59-9,
Tetrakis(diethylamido)uranium 40949-94-8, Potassium
bis(trimethylsilyl)amide 41836-21-9, Tris(bis(trimethylsilyl)amido
)cerium 41836-23-1, Tris(bis(trimethylsilyl)amido)neodymium
41836-27-5 41836-28-6, Tris(bis(trimethylsilyl)amido)yttrium
41836-29-7, Tris(bis(trimethylsilyl)amido)ytterbium 51956-20-8,
Hexakis(dimethylamido)dimolybdenum 54123-86-3 54935-70-5
55147-59-6, Bis(bis(trimethylsilyl)amino)plumbylene 55147-78-9,
Bis(bis(trimethylsilyl)amino)stannylene 55147-79-0 55147-80-3
55147-81-4 55290-25-0, Bis(bis(trimethylsilyl)amino)germylene
55940-04-0 57088-64-9 57088-65-0 59671-98-6 61361-87-3
61361-88-4 62419-10-7 63084-58-2 63226-58-4 63757-86-8,
Magnesium bis(cyclopentadienide) 63833-49-8 63833-51-2
64561-25-7 67313-80-8 67506-86-9 67938-78-7 68136-20-9,
Lanthanum Silicate 68193-40-8, Bis(η5-tert-
butylcyclopentadienyl)dimethylzirconium 68959-87-5 69021-85-8
69021-86-9, Tris(isopropylcyclopentadienyl) praseodymium
69927-52-2, Tris(bis(trimethylsilyl)amido)uranium 70309-68-1
72220-23-6 72220-24-7 72260-43-6 73138-26-8,
Bis(η5-cyclopentadienyl)manganese 74507-61-2,
Bis(η5-pentamethylcyclopentadienyl)chromium 75504-17-5
75504-18-6 **76505-24-3** 84079-75-4 84079-76-5
86563-55-5 91308-30-4 91308-32-6 95029-57-5 96350-48-0
98145-63-2, Tetrakis(diethylamido)tantalum 101200-05-9
101923-26-6 103457-72-3, Tris(bis(trimethylsilyl)amido)erbium
109433-86-5 112379-48-3 112379-49-4 114460-02-5 114504-74-4
122528-16-9 122676-67-9, Tris(bis(trimethylsilyl)amido)manganese
122676-68-0 123798-11-8 123798-14-1 126970-21-6 128110-72-5,
Aluminum silicon oxide (Al2Si8O19) 130521-76-5 130817-68-4
131297-96-6 131297-97-7, Barium bis(bis(trimethylsilyl)amide)
132644-88-3 133947-38-3 133947-39-4 144356-16-1 153608-51-6

154069-61-1 154294-23-2 156304-61-9, Tris((tert-butyl)(trimethylsilyl)amido)gallium 156304-62-0 169896-41-7, (tert-Butylimido)tris(diethylamido)tantalum 175923-04-3 178881-65-7 180335-73-3 192228-19-6 194611-64-8, Tris(diethylamido)gallium 201233-61-6 201941-77-7 207788-38-3 210758-43-3 218613-11-7, Yttrium oxide silicate (YO(SiO3)2) 251984-08-4 261929-98-0 300548-71-4 300548-72-5 300585-49-3 300585-58-4 300585-62-0 308847-87-2 312696-25-6 312739-77-8 329735-69-5 329735-72-0 329735-73-1 352535-01-4 404943-68-6 406462-34-8 406462-35-9 406462-36-0 406462-37-1 406462-38-2 406462-39-3 406462-40-6 406462-41-7 406462-42-8 406462-43-9 406462-44-0 406462-45-1 406462-46-2 406462-47-3 406462-48-4 406462-50-8, Aluminum metaphosphate oxide (Al2(PO3)4O) 406462-53-1 406462-54-2 406462-56-4 406462-59-7 406462-61-1 406462-62-2 406462-63-3, Aluminum silicon oxide (Al2Si16O35)
(**vapor deposition** of metal silicates and phosphates by reacting alkoxysilanol or alkylphosphates with metal or metalloid compd.)

IT 17906-35-3 18230-57-4
(**vapor deposition** of metal silicates by reacting alkoxysilanol and alkoxysilanediol with metal or metalloid compd.)

IT 3410-77-3, Tetraisocyanatosilane
(**vapor deposition** of silica by reacting alkoxysilanol with)

IT 7723-14-0, Phosphorus, processes
(white; **vapor deposition** of material comprising phosphorus by exposing substrate to)

L33 ANSWER 6 OF 9 HCA COPYRIGHT 2006 ACS on STN

133:185585 Compounds for use as **chemical vapor deposition** precursors, thermochromic materials light-emitting diodes, and molecular charge-transfer salts and methods of making these compounds. Diel, Bruce (Midwest Research Institute, USA). U.S. US 6103459 A 20000815, 18 pp. (English). CODEN: USXXAM. APPLICATION: US 1999-264733 19990309.

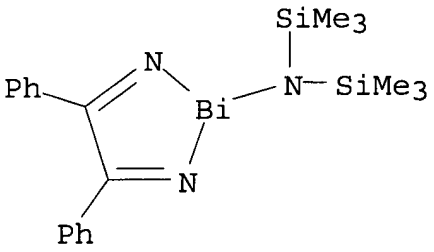
AB Novel compds. that may be used as **chem. vapor deposition** precursors, thermochromic materials, conductive polymers, light-emitting diode precursors, and mol. charge-transfer salt precursors are provided. In addn., a novel compd. that can be used to make the aforementioned compds. is provided. Still further, another aspect of the present invention is to provide methods for

making and using the novel compds. provided.

IT **288586-42-5P**, 2-Bis(trimethylsilyl)amido-4,5-diphenyl-1,3,2-diazabismole
(compds. for use as **chem. vapor deposition** precursors)

RN 288586-42-5 HCA

CN 2H-1,3,2-Diazabismol-2-amine, 4,5-diphenyl-N,N-bis(trimethylsilyl)- (9CI) (CA INDEX NAME)



IC ICM G03C001-85

INCL 430530000

CC 74-9 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)
Section cross-reference(s): 42, 76

ST **chem vapor deposition** precursor
thermochromic light emitting diode

IT **Vapor deposition** process
(**chem.**; compds. for use as **chem. vapor deposition** precursors, thermochromic materials light-emitting diodes, and mol. charge-transfer salts and methods of making compds.)

IT Electroluminescent devices
Thermochromic materials
(compds. for use as **chem. vapor deposition** precursors, thermochromic materials light-emitting diodes, and mol. charge-transfer salts and methods of making compds.)

IT Charge transfer complexes
(compds. for use as **chem. vapor deposition** precursors, thermochromic materials light-emitting diodes, and mol. charge-transfer salts and methods of making compds.)

IT 288586-37-8P 288586-46-9P 288613-00-3P 288613-01-4P

(compds. for use as **chem. vapor deposition** precursors)

IT 75-44-5, Carbonic dichloride 75-77-4, reactions 84-11-7, 9,10-Phenanthrenedione 121-45-9, Trimethylphosphite 353-85-5, Trifluoroacetonitrile 463-71-8, Thiophosgene 685-24-5 773-82-0, Pentafluorobenzonitrile 4039-32-1, Lithium bis(trimethylsilyl)amide 5035-52-9 7439-95-4, Magnesium, reactions 7440-23-5, Sodium, reactions 7784-34-1, Arsenous trichloride 7787-60-2 19555-07-8 31366-25-3, Tetrathiafulvalene 95095-31-1, 1,2-Di(2,2,2-trifluoroethoxy)ethanediimine
(compds. for use as **chem. vapor deposition** precursors)

IT 7333-08-6P, Di-3-thienylglyoxal 10025-91-9P 13450-88-9P, Gallium bromide (GaBr3) 18054-46-1P, 9,10-Phenanthrenequinone-(9,10)-bis(trimethylsilyl)diimine 242478-29-1P, 2-Chloro-4,5-[9,10,d]-phenanthro-1,3,2-diazastibole 242478-31-5P, 2-Chloro-4,5-diphenyl-1,3,2-diazastibole 242478-33-7P, 2-Chloro-4,5-[9,10,d]-phenanthro-1,3,2-diazabismole 242478-34-8P, 2-Bis(trimethylsilyl)amido-4,5-[9,10,c]-phenanthro-1,3,2-diazastibole 242478-35-9P, 2-Bis(trimethylsilyl)amido-4,5-diphenyl-1,3,2-diazastibole 255867-39-1P, N,N'-Bis(trimethylsilyl)-1,2-bis(pentafluorophenyl)ethanediimine 255867-40-4P 288586-32-3P, N,N'-Bis(trimethylsilyl)-1,2-bis(3-thienyl)ethanediimine 288586-33-4P, 1,1,1,4,4,4-Hexafluoro-2,3-butanediimine 288586-34-5P 288586-35-6P, 2-Chloro-4,5-di(trifluoromethyl)-1,3,2-diazastibole 288586-36-7P, 2-Chloro-4,5-di(trifluoromethyl)-1,3,2-diazabismole 288586-38-9P, 2-Phenyl-4,5-di(2,2,2-trifluoroethoxy)-1,3,2-diazastibole 288586-39-0P, 2H-Phenanthro[9,10-d]imidazol-2-one 288586-40-3P, 4,5-Di(pentafluorophenyl)-2H-imidazol-2-one 288586-41-4P, 2-[Bis(2,2,2-trifluoroethyl)]amido-4,5-di(trifluoromethyl)-1.3,2,-diazastilbole **288586-42-5P**, 2-Bis(trimethylsilyl)amido-4,5-diphenyl-1,3,2-diazabismole 288586-43-6P, 2-Phenyl-4,5-[9,10,c]-phenanthro-1,3,2-diazabismole 288586-44-7P, 2-Chloro-4,5-di(3-thienyl)-1,3,2-diazaarsole 288586-45-8P, 4,5-Di(3-thienyl)-2H-imidazol-2-one
(compds. for use as **chem. vapor deposition** precursors)

L33 ANSWER 7 OF 9 HCA COPYRIGHT 2006 ACS on STN

131:38437 Low-temperature **CVD** of **bismuth** strontium tantalum **oxide films** using **bismuth**

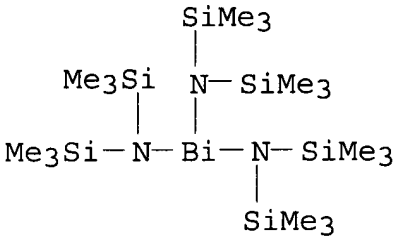
amides. Hintermaier, Frank; Van Buskirk, Peter; Roeder, Jeffrey R.; Hendrix, Bryan; Baum, Thomas H.; Desrochers, Debra A. (Siemens Aktiengesellschaft, Germany; Advanced Technology Materials, Inc.). PCT Int. Appl. WO 9929926 A1 19990617, 41 pp. DESIGNATED STATES: W: JP, KR; RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE. (English). CODEN: PIXXD2. APPLICATION: WO 1998-US26257 19981210. PRIORITY: US 1997-69041 19971210.

AB **CVD** is used to form a **film** of **Bi** **oxide**, Sr oxide, and Ta oxide on a heated substrate by decompg. the precursors of these oxides at the surface of the substrate. The precursor of **Bi** oxide is a **Bi** complex which includes ≥1 amide group and is decompd. and deposited at <450°. The film of **Bi**, Sr, and Ta oxides obtained by low-temp. **CVD** is predominantly nonferroelec., but can be converted into a **ferroelec.** film by subsequent heating.

IT **76505-24-3**, **Bismuth** tris(bis(**trimethylsilyl**)**amide**)
(low-temp. **CVD** of **bismuth** strontium tantalum **oxide films** using **bismuth** amides)

RN 76505-24-3 HCA

CN Bismuthinetriamine, hexakis(trimethylsilyl)- (9CI) (CA INDEX NAME)



IC ICM C23C016-40
ICS H01L029-00; C23C018-12; C30B025-02

CC 76-8 (Electric Phenomena)
Section cross-reference(s): 75

ST **CVD bismuth** amide low temp; oxide **bismuth** strontium tantalum low temp **CVD**; **ferroelec bismuth** strontium tantalum **oxide film CVD**

IT **Vapor deposition** process
(**chem.**; low-temp. **CVD** of **bismuth** strontium tantalum **oxide films** using

bismuth amides)

IT Heat
Ion beams
Plasma
UV radiation
(in low-temp. **CVD** of **bismuth** strontium tantalum **oxide films** using **bismuth** amides)

IT **Ferroelectric** capacitors
Ferroelectric memory devices
MOSFET (transistors)
(low-temp. **CVD** of **bismuth** strontium tantalum **oxide ferroelec. films** for)

IT Transistors
(low-temp. **CVD** of **bismuth** strontium tantalum **oxide ferroelec. films** on substrates contg.)

IT **Ferroelectric** films
(low-temp. **CVD** of **bismuth** strontium tantalum **oxide films** using **bismuth** amides in prepn. of **ferroelec.** films)

IT Polyamines
Polyethers, processes
(low-temp. **CVD** of **bismuth** strontium tantalum **oxide films** using precursors contg.)

IT 1314-35-8, Tungsten oxide (WO3), processes 7439-88-5, Iridium, processes 7440-05-3, Palladium, processes 7440-06-4, Platinum, processes 7440-16-6, Rhodium, processes 7440-57-5, Gold, processes 11113-84-1, Ruthenium oxide 12624-27-0, Rhenium oxide 12645-46-4, Iridium oxide 12680-36-3, Rhodium oxide 61970-39-6, Osmium oxide 110621-08-4, Barium copper yttrium oxide (Ba2Cu3YO6-7) 116224-72-7, **Bismuth** calcium copper strontium oxide (Bi2Ca2Cu3Sr2O10) 119173-61-4, Zirconium nitride 138290-45-6, Titanium nitride (TiN0-1) 226225-66-7, Tantalum tungsten nitride (TaWN0-2.7)
(low-temp. **CVD** of **bismuth** strontium tantalum **oxide ferroelec. films** on substrates contg.)

IT 1304-76-3, **Bismuth** oxide (Bi2O3), processes 36830-74-7, Strontium bis(dipivaloylmethanate) 57376-43-9 57403-58-4, **Bismuth** tris(dimethylamide) **76505-24-3**, **Bismuth** tris(bis(**trimethylsilyl**)**amide**)

124191-06-6
(low-temp. **CVD** of **bismuth** strontium tantalum **oxide films** using **bismuth** amides)

IT 150939-76-7, Bis(2,2,6,6-tetramethyl-3,5-heptanedionato)(tetraglyme)strontium 177580-53-9, Tetraisopropoxy(2,2,6,6-tetramethyl-3,5-heptanedionato)tantalum
(low-temp. **CVD** of **bismuth** strontium tantalum **oxide films** using **bismuth** amides and)

IT 112-49-2, Triglyme 143-24-8, Tetraglyme 3030-47-5 3083-10-1, N,N,N',N'',N''',N''''-Hexamethyltriethylenetetramine
(low-temp. **CVD** of **bismuth** strontium tantalum **oxide films** using precursors contg.)

IT 12010-48-9P, **Bismuth** niobium potassium oxide (BiNb5K2O15) 12048-25-8P, **Bismuth** potassium titanium oxide (BiKTi2O6) 13595-86-3P, **Bismuth** tungsten oxide (Bi2WO6) 50811-07-9P, **Bismuth** strontium tantalum oxide (Bi2SrTa2O9) 51403-91-9P, **Bismuth** niobium strontium oxide (Bi2Nb2SrO9) 156832-05-2P, **Bismuth** niobium strontium tantalum oxide (Bi2Nb0-2SrTa0-2O9) 187239-99-2P 219534-62-0P 219534-64-2P 219534-66-4P
(low-temp. **CVD** of **ferroelec.** films contg.)

IT 7722-84-1, Hydrogen peroxide, processes 7782-44-7, Oxygen, processes 10024-97-2, Nitrogen oxide (N2O), processes 10028-15-6, Ozone, processes 10102-43-9, Nitric oxide, processes 10102-44-0, Nitrogen dioxide, processes 12033-49-7, Nitrogen oxide (NO3)
(oxidizing agent; in low-temp. **CVD** of **bismuth** strontium tantalum **oxide films** using **bismuth** amides)

IT 1303-00-0, Gallium arsenide, processes 1309-48-4, Magnesium oxide (MgO), processes 1314-23-4, Zirconium oxide (ZrO2), processes 1344-28-1, Aluminum oxide (Al2O3), processes 7440-21-3, Silicon, processes 7631-86-9, Silica, processes 12033-89-5, Silicon nitride (Si3N4), processes 12047-27-7, Barium titanate (BaTiO3), processes 12060-00-3, Lead titanium oxide (PbTiO3) 12060-59-2, Strontium titanate (SrTiO3)
(substrate; low-temp. **CVD** of **bismuth** strontium tantalum **oxide films** on)

L33 ANSWER 8 OF 9 HCA COPYRIGHT 2006 ACS on STN
129:325345 Liquid precursor for formation of metal oxides. Gordon, Roy G. (The President and Fellows of Harvard College, USA). PCT Int.

Appl. WO 9846617 A1 19981022, 49 pp. DESIGNATED STATES: W: CA, JP, KR; RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE. (English). CODEN: PIXXD2. APPLICATION: WO 1998-US7829 19980417. PRIORITY: US 1997-43279 19970417.

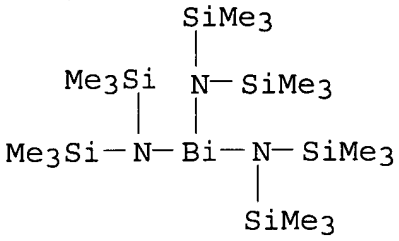
AB A liq. precursor is provided for the formation of metal **oxide films** comprising a mixt. of two or more types of beta-diketonate ligands bound to one or more metals. For example, a liq. mixt. was formed of the mixed Al beta-diketonates derived from two or more of the ligands 2,6-dimethyl-3,5-heptanedione; 2,7-dimethyl-3,5-heptanedione; 2,6-dimethyl-3,5-octanedione; 2,2,6-trimethyl-3,5-heptanedione; 2,8-dimethyl-4,6-nonanedione; 2,7-dimethyl-4,6-nonanedione; 2,2,7-trimethyl-3,5-octanedione; and 2,2,6-trimethyl-3,5-octanedione. The β-diketonate includes derivs. of R1C(O)CHR3C(O)R2 (R1, R2 = alkyl, fluoroalkyl, of an O- or N-contg. alkyl; R3 = same as R1 or R2, or H). **Films** of metal **oxides** are **deposited** from **vaporized** precursor mixts. of metal beta-diketonates and, optionally, oxygen or other sources of oxygen. This process may be used to deposit high-purity, transparent metal **oxide films** on a substrate. The liq. mixts. may also be used for spray coating, spin coating and sol-gel deposition of materials.

IT **7440-69-9DP**, **Bismuth**, mixed β-diketonate complexes, preparation **76505-24-3P**, **Bismuth** tris[bis(**trimethylsilyl**)**amide**]
(prepn. of metal complexes of mixed β-diketonates as liq. precursors for **CVD** of metal **oxide films**)

RN 7440-69-9 HCA
CN Bismuth (7CI, 8CI, 9CI) (CA INDEX NAME)

Bi

RN 76505-24-3 HCA
CN Bismuthinetriamine, hexakis(trimethylsilyl)- (9CI) (CA INDEX NAME)



IC ICM C07F019-00
ICS C23C016-00
CC 78-2 (Inorganic Chemicals and Reactions)
ST metal oxide prepn liq diketonate precursor; diketonate metal prepn liq **CVD** precursor
IT Ketones, preparation
(1,3-diketones, metal complexes; prepn. of metal complexes of mixed β-diketonates as liq. precursors for **CVD** of metal **oxide films**)
IT **Vapor deposition** process
(**chem.**; of metal complexes of mixed β-diketonates as liq. precursors for **CVD** of metal **oxide films**)
IT Transition metal complexes
(diketone; prepn. of metal complexes of mixed β-diketonates as liq. precursors for **CVD** of metal **oxide films**)
IT Ketones, preparation
(diketones, transition metal complexes; prepn. of metal complexes of mixed β-diketonates as liq. precursors for **CVD** of metal **oxide films**)
IT Films
Liquid mixtures
(prepn. of metal complexes of mixed β-diketonates as liq. precursors for **CVD** of metal **oxide films**)
IT Oxides (inorganic), preparation
(prepn. of metal complexes of mixed β-diketonates as liq. precursors for **CVD** of metal **oxide films**)
IT Coating process
(spin; of metal complexes of mixed β-diketonates as liq. precursors for formation of metal **oxide films**

)

IT Coating process
(spray; of metal complexes of mixed β-diketonates as liq. precursors for formation of metal **oxide films**
)

IT 1314-36-9, Yttrium **oxide** (Y2O3), reactions
(**film**; prepn. of metal complexes of mixed β-diketonates as liq. precursors for **CVD** of metal **oxide films**)

IT 471-34-1P, Calcium carbonate, preparation 513-77-9P, Barium carbonate 1304-76-3P, **Bismuth oxide**, preparation 1306-38-3P, Cerium **oxide** (CeO2), preparation 1308-04-9P, Cobalt(III) **oxide** 1308-38-9P, Chromium **oxide** (Cr2O3), preparation 1309-37-1P, Iron **oxide** (Fe2O3), preparation 1309-48-4P, Magnesium **oxide** (MgO), preparation 1312-43-2P, Indium **oxide** (In2O3) 1312-81-8P, Lanthanum **oxide** 1313-96-8P, Niobium **oxide** 1313-99-1P, Nickel **oxide**, preparation 1314-13-2P, Zinc **oxide** (ZnO), preparation 1314-23-4P, Zirconium **oxide** (ZrO2), preparation 1314-61-0P, Tantalum **oxide** (Ta2O5) 1317-34-6P, Manganese **oxide** (Mn2O3) 1317-38-0P, Copper **oxide** (CuO), preparation 1317-39-1P, Copper **oxide** (Cu2O), preparation 1335-25-7P, Lead **oxide** 1344-28-1P, Aluminum **oxide** (Al2O3), preparation 1633-05-2P, Strontium carbonate 7542-09-8P, Cobalt carbonate 11098-99-0P, Molybdenum **oxide** 11099-11-9P, Vanadium **oxide** 12036-10-1P, Ruthenium **oxide** (RuO2) 12047-27-7P, Barium titanium **oxide** (BaTiO3), preparation 13463-67-7P, Titanium dioxide, preparation 18282-10-5P, Tin dioxide 37305-87-6P, Barium strontium titanate 214904-75-3P, Ruthenium **oxide** (RuO0.5)
(**film**; prepn. of metal complexes of mixed β-diketonates as liq. precursors for **CVD** of metal **oxide films**)

IT 123-54-6, 2,4-Pentanedione, reactions
(for attempted prepn. of tantalum complex of mixed β-diketonates as liq. precursors for **CVD** of metal **oxide films**)

IT 7664-41-7, Ammonia, reactions
(for prepn. of metal complexes of mixed β-diketonates as liq. precursors for **CVD** of metal **oxide films**)

IT 75-97-8, tert-Butyl methyl ketone 97-62-1, Ethyl isobutyrate 97-93-8, Triethylaluminum, reactions 108-10-1, Isobutyl methyl ketone 108-64-5, Ethyl isovalerate 142-71-2, Copper(II) acetate 301-04-2, Lead acetate 546-68-9 557-34-6, Zinc acetate 563-80-4, Isopropyl methyl ketone 753-73-1, Dimethyltin dichloride 1118-71-4, 2,2,6,6-Tetramethyl-3,5-heptanedione 2414-98-4, Magnesium ethoxide 3030-47-5, Pentamethyldiethylenetriamine 3236-82-6, Niobium(V) ethoxide 4039-32-1, Lithium bis(**trimethylsilylamide**) 6074-84-6, Tantalum(V) ethoxide 7440-39-3, Barium, reactions 7452-79-1, Ethyl 2-methylbutyrate 7718-54-9, Nickel dichloride, reactions 7727-18-6, Vanadyl trichloride 7782-92-5, Sodamide 7787-60-2, **Bismuth** trichloride 7789-78-8, Calcium hydride 10025-73-7, Chromium trichloride 10025-82-8, Indium trichloride 10099-58-8, Lanthanum trichloride 10241-05-1, Molybdenum pentachloride 10361-92-9, Yttrium trichloride 13477-09-3, Barium hydride 13598-33-9, Strontium hydride 14024-18-1, Iron tris(acetylacetonate) 14284-89-0, Manganese tris(acetylacetonate) 17501-44-9, Zirconium tetrakis(acetylacetonate) 20759-14-2, Ruthenium trichloride monohydrate 57526-28-0, 2-Methylbutyryl chloride 74418-77-2 78579-61-0, 2,2,6,6-Tetramethyl-3,5-octanedione 188530-39-4, 6-Ethyl-2,2-dimethyl-3,5-octanedione 212791-15-6, 3,7-Dimethyl-4,6-nonanedione 214904-66-2 214904-74-2
(prepn. of metal complexes of mixed β-diketonates as liq. precursors for **CVD** of metal **oxide films**)

IT 110-18-9DP, metal mixed β-diketonate complexes 112-24-3DP, strontium mixed β-diketonate complexes 7307-07-5P, 2,7-Dimethyl-3,5-octanedione 7307-08-6P, 2,8-Dimethyl-4,6-nonanedione 7333-23-5P, 2,2,6-Trimethyl-3,5-heptanedione 7429-90-5DP, Aluminum, mixed β-diketonate complexes, preparation 7439-89-6DP, Iron, mixed β-diketonate complexes, preparation 7439-91-0DP, Lanthanum, mixed β-diketonate complexes, preparation 7439-92-1DP, Lead, mixed β-diketonate complexes, preparation 7439-95-4DP, Magnesium, mixed β-diketonate complexes, preparation 7439-96-5DP, Manganese, mixed β-diketonate complexes, preparation 7439-98-7DP, Molybdenum, mixed β-diketonate complexes, preparation 7440-02-0DP, Nickel, mixed β-diketonate complexes, preparation 7440-03-1DP, Niobium, mixed β-diketonate complexes, preparation 7440-18-8DP, Ruthenium, mixed β-diketonate complexes, preparation 7440-24-6DP, Strontium, mixed β-diketonate

triethylenetetraamine complexes, preparation 7440-25-7DP, Tantalum, mixed β-diketonate ethoxide complexes, preparation 7440-31-5DP, Tin, mixed β-diketonate di-Me complexes, preparation 7440-32-6DP, Titanium, mixed β-diketonate isopropoxide complexes, preparation 7440-39-3DP, Barium, mixed β-diketonate complexes, preparation 7440-45-1DP, Cerium, mixed β-diketonate complexes, preparation 7440-47-3DP, Chromium, mixed β-diketonate complexes, preparation 7440-48-4DP, Cobalt, mixed β-diketonate complexes, preparation 7440-50-8DP, Copper, mixed β-diketonate complexes, preparation 7440-62-2DP, Vanadium, mixed β-diketonate complexes, preparation 7440-65-5DP, Yttrium, mixed β-diketonate complexes, preparation 7440-66-6DP, Zinc, mixed β-diketonate complexes, preparation 7440-67-7DP, Zirconium, mixed β-diketonate complexes, preparation **7440-69-9DP**, **Bismuth**, mixed β-diketonate complexes, preparation 7440-70-2DP, Calcium, mixed β-diketonate complexes, preparation 7440-74-6DP, Indium, mixed β-diketonate complexes, preparation 12192-25-5DP, Titanyl ion, mixed β-diketonate complexes 18362-64-6P, 2,6-Dimethyl-3,5-heptanedione 20644-97-7DP, Vanadyl, mixed β-diketonate complexes 69725-37-7P, 2,2,7-Trimethyl-3,5-octanedione **76505-24-3P**, **Bismuth** tris[bis(**trimethylsilyl**)**amide**] 212791-13-4P, 2,6-Dimethyl-3,5-octanedione 212791-14-5P, 2,7-Dimethyl-4,6-nonanedione 212791-16-7P, 2,2,6-Trimethyl-3,5-octanedione

(prepn. of metal complexes of mixed β-diketonates as liq. precursors for **CVD** of metal **oxide** **films**)

L33 ANSWER 9 OF 9 HCA COPYRIGHT 2006 ACS on STN

129:285207 Bismuth amide compounds and compositions, and **chemical vapor deposition** method of forming bismuth-containing films therewith. Glassman, Timothy E.; Bhandari, Gautam; Baum, Thomas H. (Advanced Technology Materials, Inc., USA). PCT Int. Appl. WO 9843988 A1 19981008, 33 pp. DESIGNATED STATES: W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT,

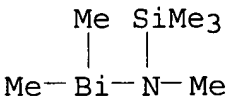
LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG. (English). CODEN: PIXXD2. APPLICATION: WO 1998-US6127 19980326. PRIORITY: US 1997-828566 19970331.

AB A method is provided of forming a Bi-contg. material layer on a substrate, comprising bubbler delivery or liq. delivery vaporization of a Bi amide source reagent to form a Bi contg. source vapor, and introducing the Bi-contg. source vapor to a **CVD** chamber to form the Bi-contg. material layer on the substrate. The Bi amide source reagent may include a Bi amide compd. BiL1xL2y(NR1R2)z wherein: Z is an integer of from 1 to 3; x + y + z = 3; each of L1 and L2 is independently selected from C1-C4 alkyl, C1-C4 alkoxide, β-diketonate, cyclic amido, cyclic trisalkoxoamine and C6-C10 aryl; and each of R1 and R2 is independently selected from C1-C8 alkyl, C1-C8 alkoxy, C6-C8 cycloalkyl, C6-C10 aryl, C1-C4 carboxyl, and SiR33, wherein each R3 is independently selected from H and C1-C4 alkyl. Bi-contg. films of the invention may be used in the construction of spatial light modulator devices comprising a BSO (silicosillenite) layer deposited on a substrate, and an Al-Ta-**oxide** (ATO) insulator **layer** on the BSO layer.

IT **7566-56-5 76505-24-3**
(for prepn. of bismuth-contg. films via **CVD**)

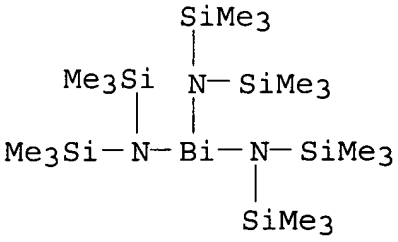
RN 7566-56-5 HCA

CN Bismuthinamine, N,1,1-trimethyl-N-(trimethylsilyl)- (9CI) (CA INDEX NAME)



RN 76505-24-3 HCA

CN Bismuthinetriamine, hexakis(trimethylsilyl)- (9CI) (CA INDEX NAME)



IC ICM C07F009-70

ICS C07F009-90; B32B009-00; G02F001-135; C23C016-00
CC 78-2 (Inorganic Chemicals and Reactions)
Section cross-reference(s): 73
ST bismuth amide **chem vapor deposition**; film bismuth contg **CVD** prepn; spatial light modulator BSO ATO layer; silica layer **CVD** prepn
IT Amines, reactions
(bismuth complexes; prepn. of bismuth-contg. film layers via **CVD** of bismuth amides)
IT **Vapor deposition** process
(**chem.**; prepn. of bismuth-contg. film layers via **CVD** of bismuth amides)
IT Films
(prepn. of bismuth-contg. film layer via **CVD** of bismuth amides)
IT Spatial light modulators
(prepn. of spatial light modulator devices comprising BSO (silicosillenite) layer and insulator layer via **CVD** of bismuth amides)
IT 78-10-4 603-33-8, Triphenylbismuth 13170-23-5 18165-85-0, tert-Butylsilane 30736-07-3, Di-tert-butylsilane 124687-44-1 129971-75-1 130234-54-7 134365-11-0 213772-33-9, (Tetrahydrofuran)tris(triphenylsiloxy)bismuth 213772-48-6
(for prepn. of bismuth silicon **oxide** material **layers** via **CVD**)
IT 1624-01-7
(for prepn. of bismuth silicon oxide or silicon **oxide** material **layers** via **CVD**)
IT **7566-56-5** 57376-43-9, Tris(diethylamido)bismuth 57376-44-0, Tris(dipropylamido)bismuth 57403-58-4, Tris(dimethylamido)bismuth **76505-24-3** 124191-06-6, Tris(diphenylamido)bismuth 213772-05-5, Tris(dicyclohexylamido)bismuth 213772-11-3, Tris(cyclohexylamido)bismuth 213772-17-9, Tris(phenylamido)bismuth 213772-23-7
(for prepn. of bismuth-contg. films via **CVD**)
IT 17048-10-1, Tetrakis(diethylamino)silane
(for prepn. of silicon **oxide** material **layer** via **CVD**)
IT 12233-73-7P, Bismuth germanium oxide (Bi12GeO20)
(prepn. of bismuth germanium **oxide** thin **film** by **CVD** of bismuth amide)

IT 1304-76-3P, Bismuth oxide (Bi2O3), preparation
(prepn. of bismuth **oxide** thin **film** by **MOCVD** of bismuth amide)
IT 53572-00-2P, Bismuth strontium titanate
(prepn. of bismuth strontium titanate thin film by **CVD** of bismuth amide)
IT 11115-71-2P, Bismuth titanate 12441-73-5P, Bismuth titanium oxide (Bi12TiO20)
(prepn. of bismuth titanium **oxide** thin **film** by **CVD** of bismuth amide)
IT 213026-42-7P, Bismuth silicon **oxide**
(prepn. of **layer** via **CVD** of bismuth-contg. and silicon-contg. source reagent(s))
IT 12377-72-9P, Bismuth oxide silicate (Bi12O16(SiO4))
(prepn. of sillenite thin film by **MOCVD** of bismuth amide)
IT 166877-45-8P, Bismuth strontium tantalum oxide
(prepn. of strontium bismuth tantalate thin film by **MOCVD** of bismuth amide)
IT 60-29-7, Diethyl ether, uses 101-84-8 108-88-3, uses 109-99-9, THF, uses 110-54-3, Hexane, uses 111-65-9, Octane, uses 142-68-7, Tetrahydropyran
(solvent for delivery of bismuth amides in **CVD** system to give bismuth-contg. films)

=> d l36 1-27 ti

L36 ANSWER 1 OF 27 HCA COPYRIGHT 2006 ACS on STN
TI Synthesis and Characterization of the First Azastibatranes and Azabismatranes

L36 ANSWER 2 OF 27 HCA COPYRIGHT 2006 ACS on STN
TI Evidence for an Unstable Bi(II) Radical from Bi-O Bond Homolysis. Implications in the Rate-Determining Step of the SOHIO Process

L36 ANSWER 3 OF 27 HCA COPYRIGHT 2006 ACS on STN
TI Synthesis and Characterization of Chelating Triamide Complexes of Bismuth and Antimony

L36 ANSWER 4 OF 27 HCA COPYRIGHT 2006 ACS on STN

TI Preparation of non-cluster type bismuth compounds to be used as imaging contrast agents and for treatment of gastrointestinal disorders

L36 ANSWER 5 OF 27 HCA COPYRIGHT 2006 ACS on STN
TI Geminal arsa(III)amide and trisubstituted antimony and bismuth amides from the sterically hindered, N-functionalised amido ligand [{2-(6-Me)C5H3N}NSiMe3]-

L36 ANSWER 6 OF 27 HCA COPYRIGHT 2006 ACS on STN
TI Method for preparation of organic compound using organobismuth compound

L36 ANSWER 7 OF 27 HCA COPYRIGHT 2006 ACS on STN
TI Synthesis and characterization of the first examples of 1,3,2-diazastibole and 1,3,2-diazabismole ring compounds

L36 ANSWER 8 OF 27 HCA COPYRIGHT 2006 ACS on STN
TI Homoleptic bismuth amides

L36 ANSWER 9 OF 27 HCA COPYRIGHT 2006 ACS on STN
TI Bismuth compounds

L36 ANSWER 10 OF 27 HCA COPYRIGHT 2006 ACS on STN
TI Synthesis and Characterization of Group 13 and 15 Selenolates and Tellurolates and the x-ray Crystal Structures of Ga[TeSi(SiMe3)3]3, In[SeC(SiMe3)3]3, {In[SeSi(SiMe3)3]3}2(μ-DMPE), and P[SeSi(SiMe3)3]3

L36 ANSWER 11 OF 27 HCA COPYRIGHT 2006 ACS on STN
TI Chalcogenolato complexes of bismuth and antimony. Syntheses, thermolysis reactions, and crystal structure of Sb(SC6H2Pri3-2,4,6)3

L36 ANSWER 12 OF 27 HCA COPYRIGHT 2006 ACS on STN
TI Synthesis and crystal structure of E.O. Fischer's "red crystalline modification of tris-cyclopentadienylbismuth, (η1-C5H5)3Bi"

L36 ANSWER 13 OF 27 HCA COPYRIGHT 2006 ACS on STN
TI Monomeric volatile alkoxides of chromium and bismuth

L36 ANSWER 14 OF 27 HCA COPYRIGHT 2006 ACS on STN
TI Metal-N,N'-bis(trimethylsilyl)benzamidinates: synthesis and crystal

structure of bis[N,N'-bis(trimethylsilyl)benzamidinato]chromium(II), [PhC(NSiMe3)2]2Cr

L36 ANSWER 15 OF 27 HCA COPYRIGHT 2006 ACS on STN
TI X-ray crystal structure of bismuth dimethylamide

L36 ANSWER 16 OF 27 HCA COPYRIGHT 2006 ACS on STN
TI Molecular precursors of bismuth oxides; β-diketonates and alkoxides. Molecular structure of $[Bi2(\mu 2,\eta 1\text{-}OC2H4OMe)4(\eta 1\text{-}OC2H4OMe)2]_\infty$ and of Bi(OSiPh3)3(THF)3

L36 ANSWER 17 OF 27 HCA COPYRIGHT 2006 ACS on STN
TI Synthesis and x-ray crystal structure of a homoleptic bismuth amide

L36 ANSWER 18 OF 27 HCA COPYRIGHT 2006 ACS on STN
TI Cyclic bis(amino)arsenic, -antimony, and -bismuth chlorides and a special tris(amino)bismuthane

L36 ANSWER 19 OF 27 HCA COPYRIGHT 2006 ACS on STN
TI Dimethylantimony azide. Preparation, spectra and crystal structure. Dimethylbismuth azide. Synthesis and crystal structure. Trimethyllead azide. Refinement of the crystal structure

L36 ANSWER 20 OF 27 HCA COPYRIGHT 2006 ACS on STN
TI Bulky alkyls, amides, and aryloxides of main group 5 elements. Part 1. Persistent phosphinyl and arsinyl radicals •MRR' and their chloro precursors MRR'Cl and related compounds

L36 ANSWER 21 OF 27 HCA COPYRIGHT 2006 ACS on STN
TI Organometallic diazoalkanes. XVI. Synthesis of silyldiazoalkanes Me3Si(LnM)CN2

L36 ANSWER 22 OF 27 HCA COPYRIGHT 2006 ACS on STN
TI Organometallic diazoalkanes. XIV. Synthesis of arsenic diazoalkanes MeAs(LnM)CN2

L36 ANSWER 23 OF 27 HCA COPYRIGHT 2006 ACS on STN
TI Organometallic diazo compounds. VII. Diazoalkanes Me2MC(N2)R of the Group VB elements arsenic, antimony, and bismuth

L36 ANSWER 24 OF 27 HCA COPYRIGHT 2006 ACS on STN
TI Cyclopentadienyls (CH3)2M-σ-C5H5 of indium, antimony, and

bismuth

L36 ANSWER 25 OF 27 HCA COPYRIGHT 2006 ACS on STN
TI N-Plumbylketenimines and O-plumbylketene acetals through 1,4-hydroplumbation of conjugated unsaturated systems

L36 ANSWER 26 OF 27 HCA COPYRIGHT 2006 ACS on STN
TI Organosilylamines of arsenic, antimony, and bismuth

L36 ANSWER 27 OF 27 HCA COPYRIGHT 2006 ACS on STN
TI Metathetical reactions of organotin compounds: their use in amination

=> d l37 1-24 ti

L37 ANSWER 1 OF 24 HCA COPYRIGHT 2006 ACS on STN
TI Syntheses, Structures, and Dynamic Behavior of Chiral Racemic Organoantimony and -bismuth Compounds RR'SbCl, RR'BiCl, and RR'SbM [R = 2-(Me2NCH2)C6H4, R' = CH(Me3Si)2, M = H, Li, Na]

L37 ANSWER 2 OF 24 HCA COPYRIGHT 2006 ACS on STN
TI Biosynthesis and immunosuppressive and neurotrophic activity of FK-506 and FK-520 analogs

L37 ANSWER 3 OF 24 HCA COPYRIGHT 2006 ACS on STN
TI Synthesis and X-ray Crystal Structures of Novel Al-Bi and Ga-Bi Compounds

L37 ANSWER 4 OF 24 HCA COPYRIGHT 2006 ACS on STN
TI Synthesis and characterization of 1-aza-allyl complexes of aluminum, gallium and bismuth

L37 ANSWER 5 OF 24 HCA COPYRIGHT 2006 ACS on STN
TI The dramatic influence of diamidoamine ligands on the structure and reactivity of low-valent tin and bismuth derivatives

L37 ANSWER 6 OF 24 HCA COPYRIGHT 2006 ACS on STN
TI UV absorbents for manufacturing cosmetics

L37 ANSWER 7 OF 24 HCA COPYRIGHT 2006 ACS on STN

TI Water-soluble non-ionic triarylbismuthines. First synthesis and properties

L37 ANSWER 8 OF 24 HCA COPYRIGHT 2006 ACS on STN
TI Mild aryl ether formation in the semisynthesis of the novel macrolide immunosuppressant L-732,531

L37 ANSWER 9 OF 24 HCA COPYRIGHT 2006 ACS on STN
TI Bis-amido- complexes of heavier Group 15 metal chlorides with the sterically hindered, N-functionalized amido ligand, [{2-(6-Me)C5H3N}NSiMe3]-

L37 ANSWER 10 OF 24 HCA COPYRIGHT 2006 ACS on STN
TI Preparation of dendritic organobismuth compounds

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TI Inner-complex compounds of 5-trimethylsilylmethylthio-8-mercaptoquinoline

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TI Cyclometallaphosphazenes of antimony(III) and bismuth(III): synthesis and characterization

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TI Tris(substituted phenyl)bismuth derivative

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TI Polycyclic amides and silylamides of Ge, Sn, As, Sb and Bi

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TI Preparation of O-heteroaryl, O-alkylheteroaryl, O-alkenylheteroaryl and O-alkynylheteroarylmacrolides having immunosuppressive activity

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TI Microbial transformation product having immunosuppressive activity

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TI O-heteroaryl, O-alkylheteroaryl, O-alkenylheteroaryl and O-alkynylheteroarylrapamycin derivatives for treatment of autoimmune, inflammatory, and other diseases

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TI Preparation of heteroaryl-substituted macrolides as immunosuppressants

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TI Alkylation of (As, Sb, Bi)Cl3: Formation of [(As, Sb, Bi)RCl2], (E)-[BiR(CH2CH:C)(SiMe3)(C5H4N-2)] and 2-CH(SiMe3)2C5H4N-5-R [R = C(SiMe3)2C5H4N-2]

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TI Complexes of group 15 metals with sterically hindered thiolate ligands. Crystal and molecular structures of [Sb(2-SC5H4N)3], [Sb(2-SC5H3N-3-SiMe3)3], and [Bi(2-SC5H3N-3-SiMe3)3]

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TI Synthesis, x-ray structures, and reactivity of the first bis(amino)metallastibanes and bis(amino)metallabismuthanes

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TI N,N,N'-Tris(trimethylsilyl)organoamidine as reagents in complex chemistry

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TI The element-nitrogen double bond in cations of cyclic bis(amino)phospha-, -arsa-, -stiba-, and -bismuthines

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TI The chemistry of the silazanes. III. The reactions of silazanes with trihalides of Groups III and V elements